

Making Sense of Historical Data
Work Sheet

1. Using the tables titled Southern New Mexico Livestock Populations in 1880, 1900, 1920, 1935, 1950, 1970 and 1990, graph horse populations on the X axis and years on the Y axis. Explain why horse numbers in the Chihuahuan Desert have increased or decreased during the past 110 years.
2. Using tables titled Southern New Mexico Livestock Populations in 1880, 1900, 1920, 1935, 1950, 1970 and 1990, graph cattle populations on the X axis and years on the Y axis. Using the same tables graph sheep populations on the X axis and years on the Y axis. Explain why cattle and sheep numbers in the Chihuahuan Desert have either increased or decreased during the past 100 years.
3. We now need to establish how to determine animal units, and compare animal units among years. One cow is equal to one animal unit and one horse is equal to one and one-quarter animal units, because one horse eats one and one-quarter times more forage in a day than one cow. Either six sheep, six goats or six pigs equals one animal unit, because six of these animals eat as much as much forage in a day as one cow. Based on these values, determine the animal units present on southern New Mexico Chihuahuan semi-desert grasslands between 1900 and 1990.
4. If an animal unit is annually valued at \$400, then what is the current annual economic loss to the citizens of New Mexico?
5. An annual monetary loss of almost \$60 million is significant to a poor state such as New Mexico, but is this loss ecologically significant?

Making Sense of Historical Data

Work Sheet Key

1. Using the tables titled Southern New Mexico Livestock Populations in 1880, 1900, 1920, 1935, 1950, 1970 and 1990, graph horse populations on the X axis and years on the Y axis. Explain why horse numbers in the Chihuahuan Desert have increased or decreased during the past 110 years.

Populations during the respective years were 3,502; 69,210; 79,651; 65,781; 22,178; 9,809 and 13,501. In a recent movie, actor Don Johnson played the part of a US Army Cavalry sergeant who was ordered to kill thousands of horses when the Army decided to replace horses with tanks. Johnson and a small group of Cavalry professionals refused to kill the horses and instead drove the herd from southern Arizona to Canada. This true movie is based on General Douglas MacArthur's decision in the late 1930s to replace the horse cavalry with a mechanized tank cavalry. Prior to the 1930s the US Army annually purchased more than one-half million horses from western ranchers. Horse numbers continued to decline between 1935 and 1950, because American farmers replaced horses with tractors. The 10,000 to approximately 14,000 horses remaining, in southern New Mexico, between 1970 and 1990 were used by ranchers and horse enthusiasts who keep horses for exercise, racing or pleasure.

2. Using tables titled Southern New Mexico Livestock Populations in 1880, 1900, 1920, 1935, 1950, 1970 and 1990, graph cattle populations on the X axis and years on the Y axis. Using the same tables graph sheep populations on the X axis and years on the Y axis. Explain why cattle and sheep numbers in the Chihuahuan Desert have either increased or decreased during the past 100 years.

Cattle populations during the respective years were 41,520; 688,573; 722,183; 621,447; 517,788; 696,957 and 686,566. Sheep populations during the respective years were 201,558; 698,744; 418,729; 621,139; 516,582; 404,174 and 289,931. Cattle numbers increased between 1900 and 1920, while sheep numbers during the same time dropped more than 280,000. The great demand for sheep during this time was based on a military preference. Between 1900 and 1920, cattle and sheep were butchered and the meat sold or canned the same day. When World War I began both cattle and sheep were butchered, carcasses were salted and immediately shipped to England and Europe. Because beef carcasses were much larger and cooled slower, thousands of beef carcasses spoiled during summer. Sheep carcasses cooled quickly, even in summer, and few spoiled during shipping; hence, the preference by the military for sheep meat.

During World War I, the US Military annually purchased more than two million sheep. At this point in history there were few synthetic fibers, and the military

used wool for coat and pant liners. By the middle of World War II, refrigerated meat lockers were installed in ships and synthetic petroleum fibers and cotton were blended with wool. Once refrigeration and wool blends were available, the military meat preference shifted to cattle.

3. We now need to establish how to determine animal units, and compare animal units among years. One cow is equal to one animal unit and one horse is equal to one and one-quarter animal units, because one horse eats one and one-quarter times more forage in a day than one cow. Either six sheep, six goats or six pigs equals one animal unit, because six of these animals eat as much as much forage in a day as one cow. Based on these values, determine the animal units present on southern New Mexico Chihuahuan semi-desert grasslands between 1900 and 1990.

In 1900 there were 69,210 horses, 688,573 cattle, 698,744 sheep, 82,628 goats and 6,642 pigs. To determine total animal units during 1900, multiply 69,210 horses by 1.25 (this equal 86,512.5 animal units); multiply 688,573 times 1.00 (this equals 688,573 animal units); add 698,744 (sheep) plus 82,628 (goats) and 6,642 (pigs) and divide the total (788,014) by 6 (this equals 131,335.66). Now add 86,512.5, 688,573 and 131,335.66; the grand total is 906,421.16 or 906,421 animal units were present in 1900 on the southern one-half of the New Mexico Territory.

On the same area in 1990, there were 13,501 horses, 686,566 cattle, 289,932 sheep, 27,891 goats and 1,798 pigs. To determine total animal units multiply 13,501 horses by 1.25 (this equals 16,876.25 animal units); multiply 686,566 times 1.00 (this equals 686,566 animal units); add 289,931 (sheep) plus 27,891 (goats) and 1,798 (pigs) and divide the total (319,620) by 6 (this equals 53,270). Now add 16,876.25, 686,566 and 53,270; the grand total is 756,712.25 or 756,712 animal units were present in 1990 on the southern one-half of the state of New Mexico.

To determine the difference in animal units during 90 years, subtract 906,421 from 756,712; the difference is 149,709 or almost 150,000 animal units were lost between 1900 and 1990.

4. If an animal unit is annually valued at \$400, then what is the current annual economic loss to the citizens of New Mexico?

If there are 150,000 fewer animal units grazing in southern New Mexico, and each units annual value is \$400; then annual revenue losses can be calculated by multiplying 150,000 time 400. The annual loss to New Mexico taxpayers is \$60,000,000.

5. An annual loss of almost \$60 million is monetarily significant to a poor state such as New Mexico, but is this loss ecologically significant?

To answer this question it is necessary to calculate the annual loss in plant production, or the forage required to feed 150,000 additional animal units. Each

animal unit requires 25 pounds of plant biomass each day, and while searching for plant biomass an animal unit will destroy an additional 5 pounds per day.

To calculate the annual loss in plant production multiply 30 pounds time 365 days, the total (10,950 pounds) is then multiplied by 150,000 animal units. Chihuahuan Desert semi-desert grasslands in the southern one-half of New Mexico annually produce 1.6 billion fewer pounds of forage in 1990 than the same area did 90 years ago.

FINAL COMMENT

Because perennial grass is the primary component in the diet of domestic livestock, and perennial grass slows wind and water erosion, there is a need to reestablish perennial grasses in the Chihuahuan Desert. The restoration of semi-desert grasslands within the Chihuahuan Desert would reduce rainfall runoff by slowing water movement over bare soils, increase water infiltration and add water to depleted aquifers. This would recharge the water table and springs that dried many years ago would reappear. All of these activities would provide additional plant biomass, and support greater populations of native wildlife and domestic livestock.